

INTERNATIONAL SEARCH REPORT

International application No.

PCT/SE 99/01878

A. CLASSIFICATION OF SUBJECT MATTER

IPC7: G01N 5/10, G01N 21/88

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC7: G01N

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE,DK,FI,NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

WPI, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	DE 2414162 A (G S T REGELTECHNIK GMBH), 24 October 1974 (24.10.74), page 1, line 1 - page 4, line 6, figure 1, claims 1,3,5 --	1,3-8,10-11
X	US 3740156 A (JOHN J. HEIGL ET AL), 19 June 1973 (19.06.73), column 2, line 23 - line 48; column 3, line 4 - line 64; column 4, line 27 - line 64, figures 1,3-4, claims 1,3,8, abstract --	1,3-8,10-11
X	EP 0302009 A1 (CIBA-GEIGY AG), 1 February 1989 (01.02.89), column 2, line 26 - column 4, line 36, figures 1,3 --	1,3-8,10-11

☒ Further documents are listed in the continuation of Box C.
 ☒ See patent family annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance: the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance: the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search

14 February 2000

Date of mailing of the international search report

16-02-2000

Name and mailing address of the ISA/

Swedish Patent Office

Box 5055, S-102 42 STOCKHOLM

Facsimile No. +46 8 666 02 86

Authorized officer

Marianne Bratsberg/ELY

Telephone No. +46 8 782 25 00

INTERNATIONAL SEARCH REPORT

International application No.

PCT/SE 99/01878

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	Derwent's abstract, No 91- 50312/07, week 9107, ABSTRACT OF SU, 1573401 (YAKUSHEV V P), 23 June 1990 (23.06.90) --	1,3,6
A	US 5064287 A (HAAKON T. MAGNUSSEN, JR.), 12 November 1991 (12.11.91), column 1, line 31 - column 2, line 11; column 3, line 32 - column 4, line 56, figures 1-4, abstract -- -----	1-11

INTERNATIONAL SEARCH REPORT
Information on patent family members

02/12/99

International application No.
PCT/SE 99/01878

Patent document cited in search report			Publication date	Patent family member(s)	Publication date
DE	2414162	A	24/10/74	SE 371888 B,C	02/12/74
US	3740156	A	19/06/73	NONE	
EP	0302009	A1	01/02/89	JP 1049932 A	27/02/89
US	5064287	A	12/11/91	WO 9116615 A	31/10/91

INTERNATIONAL SEARCH REPORT

International application No.
PCT/SE 99/01878

A. CLASSIFICATION OF SUBJECT MATTER

IPC7: G01N 21/05, G01N 21/88

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC7: G01N

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE,DK,FI,NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

WPI, PAJ

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X	US 3740156 A (JOHN J. HEIGL ET AL), 19 June 1973 (19.06.73), column 2, line 23 - line 48; column 3, line 4 - line 64; column 4, line 27 - line 64, figures 1,3-4, claims 1,3,8, abstract --	1,3-8,10-11
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☒ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

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- "A" document defining the general state of the art which is not considered to be of particular relevance
- "E" earlier document but published on or after the international filing date
- "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- "O" document referring to an oral disclosure, use, exhibition or other means
- "P" document published prior to the international filing date but later than the priority date claimed

"I" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance: the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance: the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search

11 April 2000

Date of mailing of the international search report

28 -04- 2000

Name and mailing address of the ISA/
Swedish Patent Office
Box 5055, S-102 42 STOCKHOLM
Facsimile No. +46 8 666 02 86

Authorized officer

Marianne Bratsberg/ELY
Telephone No. +46 8 782 25 00

INTERNATIONAL SEARCH REPORT

International application No.

PCT/SE 99/01878

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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A	US 5064287 A (HAAKON T. MAGNUSSEN, JR.), 12 November 1991 (12.11.91), column 1, line 31 - column 2, line 11; column 3, line 32 - column 4, line 56, figures 1-4, abstract -- -----	1-11

INTERNATIONAL SEARCH REPORT

Information on patent family members

02/12/99

International application No.

PCT/SE 99/01878

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EP	0302009	A1	01/02/89	JP 1049932 A	27/02/89
US	5064287	A	12/11/91	WO 9116615 A	31/10/91

PCT COOPERATION TREATY

PCT

NOTIFICATION CONCERNING
SUBMISSION OR TRANSMITTAL
OF PRIORITY DOCUMENT

(PCT Administrative Instructions, Section 411)

From the INTERNATIONAL BUREAU

To:

BERNHULT, Lennart
AB Stockholms Patentbyrå, Zacco &
Bruhn
P.O. Box 23101
S-104 35 Stockholm
SUÈDE

Date of mailing (day/month/year) 31 January 2000 (31.01.00)	
Applicant's or agent's file reference 110014800/LB LEN	IMPORTANT NOTIFICATION
International application No. PCT/SE99/01878	International filing date (day/month/year) 19 October 1999 (19.10.99)
International publication date (day/month/year) Not yet published	Priority date (day/month/year) 19 October 1998 (19.10.98)
Applicant FIBERTRACKER AB et al	

1. The applicant is hereby notified of the date of receipt (except where the letters "NR" appear in the right-hand column) by the International Bureau of the priority document(s) relating to the earlier application(s) indicated below. Unless otherwise indicated by an asterisk appearing next to a date of receipt, or by the letters "NR", in the right-hand column, the priority document concerned was submitted or transmitted to the International Bureau in compliance with Rule 17.1(a) or (b).
2. This updates and replaces any previously issued notification concerning submission or transmittal of priority documents.
3. An asterisk(*) appearing next to a date of receipt, in the right-hand column, denotes a priority document submitted or transmitted to the International Bureau but not in compliance with Rule 17.1(a) or (b). In such a case, **the attention of the applicant is directed** to Rule 17.1(c) which provides that no designated Office may disregard the priority claim concerned before giving the applicant an opportunity, upon entry into the national phase, to furnish the priority document within a time limit which is reasonable under the circumstances.
4. The letters "NR" appearing in the right-hand column denote a priority document which was not received by the International Bureau or which the applicant did not request the receiving Office to prepare and transmit to the International Bureau, as provided by Rule 17.1(a) or (b), respectively. In such a case, **the attention of the applicant is directed** to Rule 17.1(c) which provides that no designated Office may disregard the priority claim concerned before giving the applicant an opportunity, upon entry into the national phase, to furnish the priority document within a time limit which is reasonable under the circumstances.

<u>Priority date</u>	<u>Priority application No.</u>	<u>Country or regional Office or PCT receiving Office</u>	<u>Date of receipt of priority document</u>
19 Octo 1998 (19.10.98)	9803557-9	SE	18 Janu 2000 (18.01.00)

The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland Facsimile No. (41-22) 740.14.35	Authorized officer Marc Salzman Telephone No. (41-22) 338.83.38
--	---

PATENT COOPERATION TREATY

PCT

NOTIFICATION OF THE RECORDING
OF A CHANGE(PCT Rule 92bis.1 and
Administrative Instructions, Section 422)

From the INTERNATIONAL BUREAU

To:

BERNHULT, Lennart
Stockholms Patentbyrå Zacco AB
P.O. Box 23101
S-104 35 Stockholm
SUÈDE

Date of mailing (day/month/year) 18 April 2001 (18.04.01)	IMPORTANT NOTIFICATION
Applicant's or agent's file reference 110014800/LB	
International application No. PCT/SE99/01878	International filing date (day/month/year) 19 October 1999 (19.10.99)

1. The following indications appeared on record concerning:

☐ the applicant ☐ the inventor ☒ the agent ☐ the common representative

Name and Address BERNHULT, Lennart AB Stockholms Patentbyrå, Zacco & Bruhn P.O. Box 23101 S-104 35 Stockholm Sweden	State of Nationality	State of Residence
	Telephone No. +46 8/729-95-00	
	Facsimile No. +46 8/31-83-15	
	Teleprinter No.	

2. The International Bureau hereby notifies the applicant that the following change has been recorded concerning:

☐ the person ☐ the name ☒ the address ☐ the nationality ☐ the residence

Name and Address BERNHULT, Lennart Stockholms Patentbyrå Zacco AB P.O. Box 23101 S-104 35 Stockholm Sweden	State of Nationality	State of Residence
	Telephone No. +46 8/729-95-00	
	Facsimile No. +46 8/31-83-15	
	Teleprinter No.	

3. Further observations, if necessary:

4. A copy of this notification has been sent to:

<input checked="" type="checkbox"/> the receiving Office	<input type="checkbox"/> the designated Offices concerned
<input type="checkbox"/> the International Searching Authority	<input checked="" type="checkbox"/> the elected Offices concerned
<input type="checkbox"/> the International Preliminary Examining Authority	<input type="checkbox"/> other:

The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland Facsimile No.: (41-22) 740.14.35	Authorized officer F. Baechler Telephone No.: (41-22) 338.83.38
---	---

P ENT COOPERATION TREA

PCT

NOTIFICATION OF ELECTION

(PCT Rule 61.2)

From the INTERNATIONAL BUREAU

To:

Assistant Commissioner for Patents
 United States Patent and Trademark
 Office
 Box PCT
 Washington, D.C.20231
 ETATS-UNIS D'AMERIQUE

in its capacity as elected Office

Date of mailing (day/month/year) 23 June 2000 (23.06.00)	
International application No. PCT/SE99/01878	Applicant's or agent's file reference 110014800/LB
International filing date (day/month/year) 19 October 1999 (19.10.99)	Priority date (day/month/year) 19 October 1998 (19.10.98)
Applicant KARLSSON, Håkan, Ingvar et al	

1. The designated Office is hereby notified of its election made:



in the demand filed with the International Preliminary Examining Authority on:

18 May 2000 (18.05.00)



in a notice effecting later election filed with the International Bureau on:

2. The election ☒ was

was not

made before the expiration of 19 months from the priority date or, where Rule 32 applies, within the time limit under Rule 32.2(b).

The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland Facsimile No.: (41-22) 740.14.35	Authorized officer F. Baechler Telephone No.: (41-22) 338.83.38
---	---

RECORD COPY

PCT

REQUEST

The undersigned requests that the present international application be processed according to the Patent Cooperation Treaty.

For receiving Office use only

PCT/RO/99/01878

International Application No.

International Filing Date

19-10-1999

The Swedish Patent Office
PCT International Application

Name of receiving Office and "PCT International Application"

Applicant's or agent's file reference

(if desired) (12 characters maximum)

110014800/LB

Box No. I TITLE OF INVENTION

Measuring of fibre properties.

Box No. II APPLICANT

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no state of residence is indicated below.)

FIBERTRACKER AB
SE-184 84 ÅKERSBERGA
SWEDEN

☐ This person is also inventor.

Telephone No.

Facsimile No.

Teleprinter No.

State (that is, country) of nationality:

SWEDEN

State (that is, country) of residence:

SWEDEN

This person is applicant
for the purposes of:

☐ all designated
States☒ all designated States except
the United States of America☐ the United States
of America only☐ the States indicated in
the Supplemental Box

Box No. III FURTHER APPLICANT(S) AND/OR (FURTHER) INVENTOR(S)

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no state of residence is indicated below.)

KARLSSON, Håkan Ingvar
Gransättravägen 76
SE-184 61 ÅKERSBERGA
SWEDEN

This person is:

☐ applicant only☒ applicant and inventor☐ inventor only (If this check-box
is marked, do not fill in below.)

State (that is, country) of nationality:

SWEDEN

State (that is, country) of residence:

SWEDEN

This person is applicant
for the purposes of:

☐ all designated
States☐ all designated States except
the United States of America☒ the United States
of America only☐ the States indicated in
the Supplemental Box☒ Further applicants and/or (further) inventors are indicated on a continuation sheet.

Box No. IV AGENT OR COMMON REPRESENTATIVE; OR ADDRESS FOR CORRESPONDENCE

The person identified below is/has been appointed to act on behalf
of the applicant(s) before the competent International Authorities as:

☒ agent☐ common representative

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)

Lennart Bernhult
AB STOCKHOLMS PATENTBYRÅ, Zacco & Bruhn
Box 23101, SE-104 35 STOCKHOLM, Sweden

Telephone No.

+46 8 729 95 00

Facsimile No.

+46 8 31 83 15

Teleprinter No.

☐ Address for correspondence: Mark this check-box where no agent or common representative is/has been appointed and the space above is used instead to indicate a special address to which correspondence should be sent.

Continuation of Box No. III FURTHER APPLICANTS AND/OR (FURTHER) INVENTORS*If none of the following sub-boxes is used, this sheet is not to be included in the request.*

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (i.e. country) of residence if no state of residence is indicated below.)

FRANSSON, Per-Ivar
Ekbacksvägen 31
SE-184 32 ÅKERSBERGA
SWEDEN

This person is:

- ☐ applicant only
☒ applicant and inventor
☐ inventor only (If this check-box is marked, do not fill in below.)

State (i.e. country) of nationality: SWEDEN

State (i.e. country) of residence: SWEDEN

This person is applicant for the purposes of:

- ☐ all designated States ☐ all designated States except the United States of America ☒ the United States of America only ☐ the States indicated in the Supplemental Box

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (i.e. country) of residence if no state of residence is indicated below.)

This person is:

- ☐ applicant only
☐ applicant and inventor
☐ inventor only (If this check-box is marked, do not fill in below.)

State (i.e. country) of nationality:

State (i.e. country) of residence:

This person is applicant for the purposes of:

- ☐ all designated States ☐ all designated States except the United States of America ☐ the United States of America only ☐ the States indicated in the Supplemental Box

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (i.e. country) of residence if no state of residence is indicated below.)

This person is:

- ☐ applicant only
☐ applicant and inventor
☐ inventor only (If this check-box is marked, do not fill in below.)

State (i.e. country) of nationality:

State (i.e. country) of residence:

This person is applicant for the purposes of:

- ☐ all designated States ☐ all designated States except the United States of America ☐ the United States of America only ☐ the States indicated in the Supplemental Box

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- ☐ applicant only
☐ applicant and inventor
☐ inventor only (If this check-box is marked, do not fill in below.)

State (i.e. country) of nationality:

State (i.e. country) of residence:

This person is applicant for the purposes of:

- ☐ all designated States ☐ all designated States except the United States of America ☐ the United States of America only ☐ the States indicated in the Supplemental Box

☐

Further applicants and/or (further) inventors are indicated on another continuation sheet.

Box No.V DESIGNATION OF STATES

The following designations are hereby made under Rule 4.9(a) (mark the applicable check-boxes; at least one must be marked):

Regional Patent

- ☐ **AP ARIPO Patent:** GH Ghana, GM Gambia, KE Kenya, LS Lesotho, MW Malawi, SD Sudan, SL Sierra Leone, SZ Swaziland, UG Uganda, ZW Zimbabwe, and any other State which is a Contracting State of the Harare Protocol and of the PCT
- ☐ **EA Eurasian Patent:** AM Armenia, AZ Azerbaijan, BY Belarus, KG Kyrgyzstan, KZ Kazakhstan, MD Republic of Moldova, RU Russian Federation, TJ Tajikistan, TM Turkmenistan, and any other State which is a Contracting State of the Eurasian Patent Convention and of the PCT
- ☒ **EP European Patent:** AT Austria, BE Belgium, CH and LI Switzerland and Liechtenstein, CY Cyprus, DE Germany, DK Denmark, ES Spain, FI Finland, FR France, GB United Kingdom, GR Greece, IE Ireland, IT Italy, LU Luxembourg, MC Monaco, NL Netherlands, PT Portugal, SE Sweden, and any other State which is a Contracting State of the European Patent Convention and of the PCT
- ☐ **OA OAPI Patent:** BF Burkina Faso, BJ Benin, CF Central African Republic, CG Congo, CI Côte d'Ivoire, CM Cameroon, GA Gabon, GN Guinea, GW Guinea-Bissau, ML Mali, MR Mauritania, NE Niger, SN Senegal, TD Chad, TG Togo, and any other State which is a member State of OAPI and a Contracting State of the PCT (if other kind of protection or treatment desired, specify on dotted line)

National Patent (if other kind of protection or treatment desired, specify on dotted line):

- | | |
|---|---|
| <input type="checkbox"/> AE United Arab Emirates | <input type="checkbox"/> LR Liberia |
| <input type="checkbox"/> AL Albania | <input type="checkbox"/> LS Lesotho |
| <input type="checkbox"/> AM Armenia | <input type="checkbox"/> LT Lithuania |
| <input type="checkbox"/> AT Austria | <input type="checkbox"/> LU Luxembourg |
| <input type="checkbox"/> AU Australia | <input type="checkbox"/> LV Latvia |
| <input type="checkbox"/> AZ Azerbaijan | <input type="checkbox"/> MA Morocco |
| <input type="checkbox"/> BA Bosnia and Herzegovina | <input type="checkbox"/> MD Republic of Moldova |
| <input type="checkbox"/> BB Barbados | <input type="checkbox"/> MG Madagascar |
| <input type="checkbox"/> BG Bulgaria | <input type="checkbox"/> MK The former Yugoslav Republic of Macedonia |
| <input type="checkbox"/> BR Brazil | <input type="checkbox"/> MN Mongolia |
| <input type="checkbox"/> BY Belarus | <input type="checkbox"/> MW Malawi |
| <input checked="" type="checkbox"/> CA Canada | <input type="checkbox"/> MX Mexico |
| <input type="checkbox"/> CH and LI Switzerland and Liechtenstein | <input type="checkbox"/> NO Norway |
| <input type="checkbox"/> CN China | <input type="checkbox"/> NZ New Zealand |
| <input type="checkbox"/> CR Costa Rica | <input type="checkbox"/> PL Poland |
| <input type="checkbox"/> CU Cuba | <input type="checkbox"/> PT Portugal |
| <input type="checkbox"/> CZ Czech Republic | <input type="checkbox"/> RO Romania |
| <input type="checkbox"/> DE Germany | <input type="checkbox"/> RU Russian Federation |
| <input type="checkbox"/> DK Denmark | <input type="checkbox"/> SD Sudan |
| <input type="checkbox"/> DM Dominica | <input type="checkbox"/> SE Sweden |
| <input type="checkbox"/> EE Estonia | <input type="checkbox"/> SG Singapore |
| <input type="checkbox"/> ES Spain | <input type="checkbox"/> SI Slovenia |
| <input type="checkbox"/> FI Finland | <input type="checkbox"/> SK Slovakia |
| <input type="checkbox"/> GB United Kingdom | <input type="checkbox"/> SL Sierra Leone |
| <input type="checkbox"/> GD Grenada | <input type="checkbox"/> TJ Tajikistan |
| <input type="checkbox"/> GE Georgia | <input type="checkbox"/> TM Turkmenistan |
| <input type="checkbox"/> GH Ghana | <input type="checkbox"/> TR Turkey |
| <input type="checkbox"/> GM Gambia | <input type="checkbox"/> TT Trinidad and Tobago |
| <input type="checkbox"/> HR Croatia | <input type="checkbox"/> TZ Tanzania |
| <input type="checkbox"/> HU Hungary | <input type="checkbox"/> UA Ukraine |
| <input type="checkbox"/> ID Indonesia | <input type="checkbox"/> UG Uganda |
| <input type="checkbox"/> IL Israel | <input checked="" type="checkbox"/> US United States of America |
| <input type="checkbox"/> IN India | <input type="checkbox"/> UZ Uzbekistan |
| <input type="checkbox"/> IS Iceland | <input type="checkbox"/> VN Viet Nam |
| <input type="checkbox"/> JP Japan | <input type="checkbox"/> YU Yugoslavia |
| <input type="checkbox"/> KE Kenya | <input type="checkbox"/> ZA South Africa |
| <input type="checkbox"/> KG Kyrgyzstan | <input type="checkbox"/> ZW Zimbabwe |
| <input type="checkbox"/> KP Democratic People's Republic of Korea | |
| <input type="checkbox"/> KR Republic of Korea | |
| <input type="checkbox"/> KZ Kazakhstan | |
| <input type="checkbox"/> LC Saint Lucia | |
| <input type="checkbox"/> LK Sri Lanka | |

Check-boxes reserved for designating States (for the purposes of a national patent) which have become party to the PCT after issuance of this sheet:

- ☐
- ☐

Precautionary Designation Statement: In addition to the designations made above, the applicant also makes under Rule 4.9(b) all other designations which would be permitted under the PCT except any designation(s) indicated in the Supplemental Box as being excluded from the scope of this statement. The applicant declares that those additional designations are subject to confirmation and that any designation which is not confirmed before the expiration of 15 months from the priority date is to be regarded as withdrawn by the applicant at the expiration of that time limit. (Confirmation of a designation consists of the filing of a notice specifying that designation and the payment of the designation and confirmation fees. Confirmation must reach the receiving Office within the 15-month time limit.)

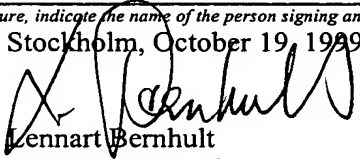
Supplemental box*If the Supplemental Box is not used, this sheet should not be included in the request.*

1. *If, in any of the Boxes, the space is insufficient to furnish all the information: in such case, write "Continuation of Box No. ..." (indicate the number of the Box) and furnish the information in the same manner as required according to the captions of the Box in which the space was insufficient, in particular.*
 - (i) *If more than two persons are involved as applicants and/or inventors and no "continuation sheet" is available: in such case, write "Continuation of Box No. III" and indicate for each additional person the same type of information as required in Box No. III. The country of the address indicated in this Box is the applicant's State (that is country) of residence if no State of residence is indicated below:*
 - (ii) *If, in Box No. II or in any of the sub-boxes of Box No. III, the indication "the States indicated in the Supplemental Box" is checked: in such case, write "Continuation of Box No. II" or "Continuation of Box No. III" or "Continuation of Boxes No. II and No. III" (as the case may be), indicate the name of the applicant(s) involved and, next to (each) such name, the State(s) (and/or, where applicable, ARIPO, Eurasian, European or OAPI patent) for the purposes of which the named person is applicant:*
 - (iii) *If, in Box No. II or in any of the sub-boxes of Box No. III, the inventor or the inventor/applicant is not inventor for the purposes of all designated States or for the purposes of the United States of America: in such case, write "Continuation of Box No. II" or "Continuation of Box No. III" or "Continuation of Boxes No. II and No. III" (as the case may be), indicate the name of the inventor(s) and, next to (each) such name, the State(s) (and/or, where applicable, ARIPO, Eurasian, European or OAPI patent) for the purposes of which the named person is inventor:*
 - (iv) *If, in addition to the agent(s) indicated in Box No. IV, there are further agents: in such case, write "Continuation of Box No. IV" and indicate for each further agent the same type of information as required in Box No. IV;*
 - (v) *If, in Box No. V, the name of any State (or OAPI) is accompanied by the indication "patent addition" or "certificate of addition" or if, in Box No. V, the name of the United States of America is accompanied by an indication "continuation" or "continuation-in-part": in such case, write "Continuation of Box No. V" and the name of each State involved (or OAPI), and after the name of each such State (or OAPI), the number of the parent title or parent application and the date of grant of the parent title or filing of the parent application:*
 - (vi) *If, in Box No. VI, there are more than three earlier applications whose priority is claimed: in such case, write "Continuation of Box No. VI" and indicated for each additional earlier application the same type of information as required in Box No. VI:*
 - (vii) *If, in Box No. VI, the earlier application is an ARIPO application: in such case, write "Continuation of Box No. VI", specify the number of the item corresponding to that earlier application and indicate at least one country party to the Paris Convention for the Protection of Industrial Property for which that earlier application was filed.*
2. *If, with regard to the precautionary designation statement contained in Box No. V, the applicant wishes to exclude any State(s) from the scope of that statement: in such case, write "Designation(s) excluded from precautionary designation statement" and indicate the name or two-letter code of each State so excluded.*
3. *If the applicant claims, in respect of any designated Office, the benefits of provisions of the national law concerning non-prejudicial disclosures of exceptions to lack of novelty: in such case, write "Statement concerning non-prejudicial disclosures or exceptions to lack of novelty" and furnish that statement below.*

CONTINUATION OF BOX IV:

Further representatives:

Agvald-Glas, Gunilla
 Bernhult, Lennart
 Bjernndell, Per
 Brundin, Gabriella
 Grahn, Cecilia
 Granström, Lars-Eric
 Grip, Joakim
 Hansson, Hans-Erik
 Hansson, Sven A.
 Hinz, Udo
 Karlsson, Per Tomas
 Lennefors, Stefan
 Lundström, Maria
 Nilsson, Brita
 Nordén, J. Åke
 Onn, Thorsten
 Petré, Urban
 Rilton, Kristina
 Westerlund, Örjan
 Åström, Elsa

Box No. VI PRIORITY CLAIM		<input type="checkbox"/> Further priority claim indicated in the Supplemental Box.		
Filing date of earlier application (day/month/year)	Number of earlier application	Where earlier application is:		
		national application: country	regional application: * regional Office	international application: receiving Office
item (1) 19/10/98 19 October 1998	9803557-9	SWEDEN		
item (2)				
item (3)				
<input checked="" type="checkbox"/> The receiving Office is requested to prepare and transmit to the International Bureau a certified copy of the earlier application(s) (only if the earlier application was filed with the Office which for the purposes of the present international application is the receiving Office) identified above as item(s): (1)				
* Where the earlier application is an ARIPO application, it is mandatory to indicate in the Supplemental Box at least one country party to the Paris Convention for the Protection of Industrial Property for which that earlier application was filed (Rule 4.10(b)(ii)). See Supplemental Box.				
Box No. VII INTERNATIONAL SEARCHING AUTHORITY				
Choice of International Searching Authority (ISA) (if two or more International Searching Authorities are competent to carry out the international search, indicate the Authority chosen; the two-letter code may be used):		Request to use results of earlier search; reference to that search (if an earlier search has been carried out by or requested from the International Searching Authority):		
ISA /SE		Date (day/month/year) Number Country (or regional Office)		
Box No. VIII CHECK LIST; LANGUAGE OF FILING				
This international application contains the following number of sheets:		This international application is accompanied by the item(s) marked below:		
request	:5 ✓	1. <input checked="" type="checkbox"/> fee calculation sheet		
description (excluding sequence listing part)	:5 ✓	2. <input type="checkbox"/> separate signed power of attorney		
claims	:2 ✓	3. <input type="checkbox"/> copy of general power of attorney; reference number, if any:		
abstract	:1 ✓	4. <input type="checkbox"/> statement explaining lack of signature		
drawings	:1 ✓	5. <input type="checkbox"/> priority document(s) identified in Box No VI as item(s):		
sequence listing part of description	:	6. <input type="checkbox"/> translation of international application into (language):		
		7. <input type="checkbox"/> separate indications concerning deposited microorganism or other biological material		
		8. <input type="checkbox"/> nucleotide and/or amino acid sequence listing in computer readable form		
		9. <input checked="" type="checkbox"/> other (specify): List of representatives		
Total number of sheets: 14 ✓				
Figure of the drawings which should accompany the abstract: Figure 2		Language of filing of the international application: SWEDISH		
Box No. IX SIGNATURE OF APPLICANT OR AGENT				
Next to each signature, indicate the name of the person signing and the capacity in which the person signs (if such capacity is not obvious from reading the request).				
Stockholm, October 19, 1999  Lennart Bernhult Representative of the applicant				

For receiving Office use only	
1. Date of actual receipt of the purported international application: 19 -10- 1999	2. Drawings: <input checked="" type="checkbox"/> received: <input type="checkbox"/> not received:
3. Corrected date of actual receipt due to later but timely received papers or drawings completing the purported international application:	
4. Date of timely receipt of the required corrections under PCT Article 11(2):	
5. International Searching Authority (if two or more are competent): ISA /SE	<input type="checkbox"/> 6. Transmittal of search copy delayed until search fee is paid

For International Bureau use only	
Date of receipt of the record copy by the International Bureau:	13 DECEMBER 1999 (13. 12. 99)

1/1

FIG.1

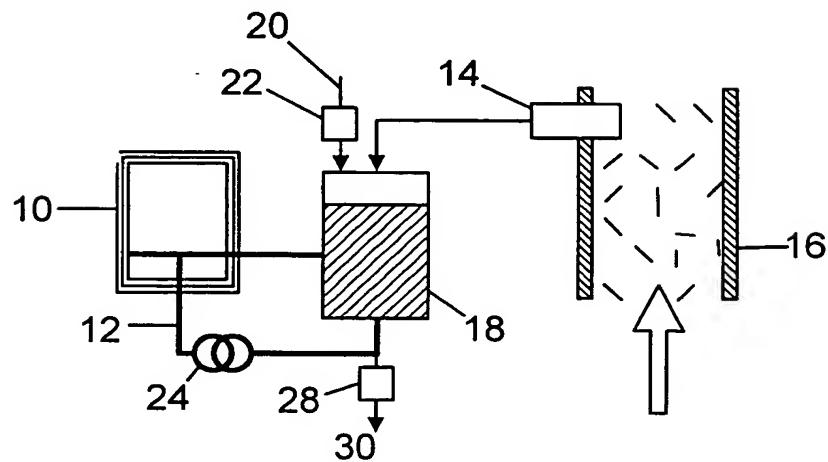


FIG.2

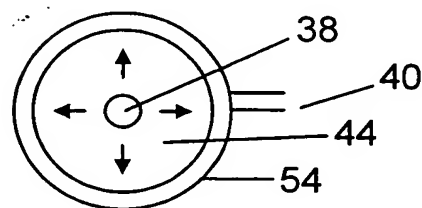
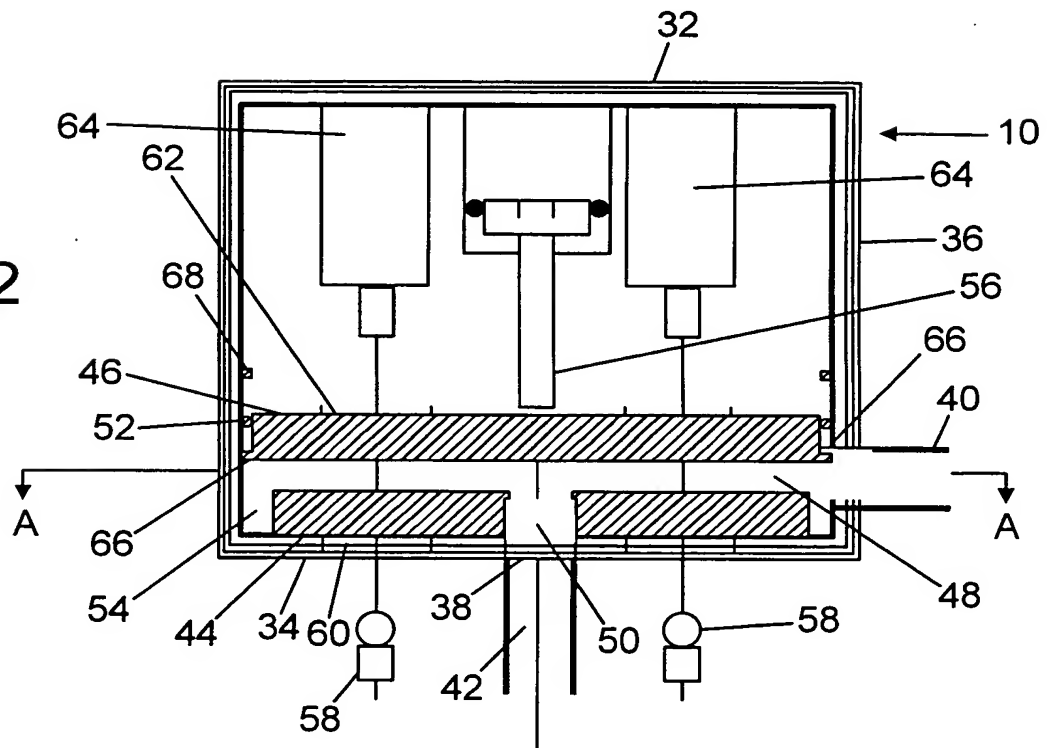


FIG.3

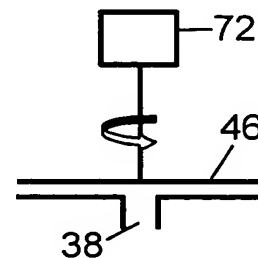


FIG.4

SUBSTITUTE SHEET

Förfarande och anordning för mätning av fiberegenskaper.

Föreliggande uppfinning avser en anordning för att möjliggöra mätning av fiberegenskaper i ett suspensionsflöde.

5 Grundprincipen för en mätning av avsett slag är att fibrerna förs in i ett mätutrymme. I mätutrymmet belyses fibrerna och betraktas genom ett optiskt system. Det optiska systemet har ett begränsat skärpedjup. Detta ställer krav på att mätutrymmets utsträckning i betraktningsriktningen måste vara mindre än skärpedjupet. Detta för att det skall vara möjligt att erhålla skarpa avbildningar av fibrerna, vilket
10 innebär att dimensionerna normalt blir mycket små, vilket i sin tur medför stora problem med att eliminera igensättning av mätutrymmet.

Ett exempel på denna grundprincip är den så kallade Kajaanimätaren (FS200), som i dagsläget möjliggör en standardmetod för att analysera fiberlängd i laboratorium. I denna kända mätare strömmar fibrerna genom en kapillär med diametern 0,2-0,4 mm.
15 Fördelen med en kapillär är att fibern orienteras i två plan. Inmätning av densamma underlättas när fibern är orienterad i strömningsriktningen. Problemet här är att kapillären lätt sätter igen om större partiklar medföljer i flödet. En sådan mätare är därför inte lämpad för användning on-line inom processindustrin, där föroreningar kan förekomma samtidigt som man har extrema krav på tillgänglighet för mätinstrumenten.

20 I mätsystemen Optikappa och PQM, som avser ett on-line arrangemang för mätning av fiberkvalitet, får fibrer strömma genom en glaskyvett med tillräckligt stora dimensioner för att igensättningsrisken skall vara mycket liten. Dimensionerna tvärs strömningsriktningen är här 10x10 mm. Detta har under längre tid använts i fabriksmiljö och fungerar tillfredsställande on-line med god tillgänglighet. Problemet med denna
25 lösning är emellertid att det inte går att få tillräckligt god optisk skärpa i avbildningen.

US patent nr 5,311,290 beskrivs en mätanordning för mätning i ett spaltformat avsnitt. Här behandlas ett fiberflöde omgivet av flöden med rent vatten i mätavsnittet. Detta uppges minska risken för igensättning på grund av fiberbuntar, fiberflockar och/eller så kallade spetor. Man undviker sålunda användning av riktigt smala
30 mätspalter.

I svensk patentansökan 8704485-5 beskrivs en anordning för beredning av en suspension för mätning i ett spaltformat mätavsnitt med höga fiberkoncentrationer. Principen bygger på att det omedelbart framför mätspalten finns en smalare spalt, där

energi tillförs via ett roterande skovelhjul, som är anordnat för att slå sönder flockar och större föroreningar. Genom att föroreningarna slås sönder minskar följaktligen också problemen med igensättning.

5 I US patent nr 3,740,156 visas hur ett prov fångas upp mellan två fönster, som är rörliga tvärs provflödesriktningen.

EP 0 302 009 visar två rörliga fönster i en kanal.

De båda sistnämnda arrangemangen fungerar dock inte tillfredsställande i ett fiberhaltigt flöde, där man vill mäta fiberstorleksfördelningen på ett statistiskt helt korrekt sätt. Stor risk för flödesgradientfraktionering finns eftersom endast en del av
10 passagen stängs.

Föreliggande uppfinning beaktar många av nackdelarna med de ovan nämnda konstruktionerna och kännetecknas i första hand av att den innefattar en mätcell, i vilken det finns en mellan två begränsningsytor definierad mätspalt samt organ för reglering av mätspaltens bredd, att begränsningsytorna har motstående, transparenta
15 partier för möjliggörande av genomstrålning av förbipasserande suspensionsflöde och mätning på optisk väg, samt att mätcellen dessutom har en för hela suspensionsflödet avsedd inloppsöppning och en för hela suspensionsflödet avsedd utloppsöppning.

Fördelaktiga utföringsformer av den nya mättingsanordningen framgår av de osjälvständiga patentkraven 2-11.

20 Den nya konstruktionen möjliggör optisk mätning av fiberegenskaper med både hög precision och god skärpa, varvid samtidigt problemet med igensättning av mätspalten elimineras på ett enkelt och praktiskt sätt. Vidare blir det möjligt att vid en fördelaktig utföringsform erhålla ett bättre definierat mätflöde än vad som beskrivs i US patent nr 5,311,290. Tvärs strömningsriktningen i x/y-planet kan, i föreliggande fall,
25 planet betraktas som oändligt. Strömningen kan alltså betraktas som strömning i ett tunt oändligt plan mellan två fasta begränsningsytor. Väldefinierade mätförhållanden råder sålunda med liten inverkan av störande randeffekter.

Liten risk för igensättning åstadkommes enligt uppfinningen genom att fibrena strömmar genom en mätspalt, vars bredd kan ändras. Vid mätning hålles mätspalten så
30 att en god avbildning av de studerade partiklarna erhålles. Mätningen blir representativ genom att hela flödet passerar genom mätspalten. Mellan mätsekvenserna kan mätspalten bringas att vidga sig, så att renspolning, företrädesvis med vatten, kan ske.

Med denna lösning erfordras inte nödvändigtvis några roterande delar i själva mätcellen, vilket däremot är fallet vid konstruktionen enligt svensk patentansökan nr 870 44 85-5.

Uppfinningen kommer nu att beskrivas närmare nedan under hänvisning till den bifogade ritningen, varvid:

5 **Fig. 1** i planvy från sidan och delvis i snitt visar den nya mätanordningen inkopplad i sitt rätta samband för mätning on-line i anslutning till en konventionell processledning;

Fig. 2 i sidosektion visar den nya mätanordningen och dess väsentliga beståndsdelar;

10 **Fig. 3** visar ett snitt utmed linjen A-A i fig. 2, varvid storleken av snittvyn dock är avsevärt reducerad; och varvid

Fig. 4 visar en möjlighet för rotation av en av de i anordningen enligt fig. 2 ingående delarna;

15 I de olika figurerna är i förekommande fall likadana delar försedda med motsvarande likadana hänvisningsbeteckningar.

20 Den i fig. 1 visade mätcellen 10 ingår i en slinga 12, i vilken ett för mätning av fiberegenskaper avsett suspensionsflöde cirkuleras. Prov tages ut med en provtagare 14 från en processledning 16 med genom pil markerad strömningsriktning och spolas över till en tank 18. I tanken 18 spädes provet i förekommande fall med vatten från en ledning 20 via en ventil 22 för erhållande av en lämplig suspension. Via en pump 24 pumpas suspensionen från tanken 18 till mätcellen 10. Suspensionsflödet från mätcellen 10 återförs därefter till tanken 18. När en mätning av hela det avsedda suspensionsflödet är avslutad öppnas en ventil 28 och systemet töms via ett avlopp 30.

25 Själva mätcellen 10 och dess för uppfinningen väsentliga delar framgår närmare av fig. 2. Mätcellen 10 har formen av en cylindrisk mätcell, som begränsas av en plan cirkulär övre vägg 32 och en plan cirkulär undre vägg 34. Mätcellens cylindervägg 36 och de båda cirkulära väggarna 32, 34 är alla lämpligen tillverkade av metall. Vid mitten av den undre väggen 34 finns en central inloppsöppning 38 för ett suspensionsflöde och i den cylindriska väggen 36 finns en motsvarande utloppsöppning 40. Axellinjerna för de båda öppningarna 38, 40 bildar i det aktuella exemplet en vinkel av 90 grader mot varandra. Ett cylindriskt inloppsrör 42 för uppriktning och stabilisering av inkommande suspensionsflöde är anslutet till inloppsöppningen 38. Inloppsröret 42 har en längd, som är flera gånger större än dess bredd. Inuti mätcellen

30

10 finns två glasskivor 44, 46, som är plana och sinsemellan parallella. Mellan de båda glasskivorna 44, 46 definieras en mätspalt 48 för suspensionsflödet, som kommer in via inloppsöppningen 38 i den undre väggen 34 och en till inloppsöppningen 38 hörande och mitt för densamma belägen central öppning 50 i den undre glasskivan 34.

5 Såsom framgår av ritningen är den övre glasskivans periferi 46 avtätad mot insidan av mätcellens 10 cylindervägg 36. För detta utnyttjas standardteknik med cirkulära tätningar 52. Den undre glasskivan 44 sträcker sig däremot vid sin periferi inte ända fram till mätcellens 10 inre begränsningsyta utan kvarlämnar ett mellanliggande ringformigt utrymme 54. Detta medför att ett centralt inkommande suspensionsflöde
10 kommer att passera radiellt utåt i mätspalten 48 mellan de båda glasskivorna 44, 46, varvid suspensionsflödets tryck är störst vid själva inloppsöppningen 38 och sedan avtar mot det ringformiga utrymmet 54.

 Av ritningen framgår också att den övre glasskivan 46 bildar en cylinderkolv, som via en positioneringsutrustning, exempelvis en tryckluftdriven kolvstång 56, är höj-
15 och sänkbar inuti mätcellen 10, så att mätspaltens 48 bredd kan ändras enligt önskan. Härigenom kan önskade mätspaltsbredder erhållas och därmed också en tillräcklig djupskärpa i mätningen. Vid den visade utföringsformen är likadana ljuskällor 58 placerade i anslutning till den undre väggens 34 utsida för genomlysning av suspensionsflödet i mätspalten 48 via resp. transparenta fönster 60, 62 i de båda
20 glasplattorna 44, 46. Inuti mätcellen 10 finns motsvarande kameror 64 för bildregistrering. Antalet ljuskällor 58 och kameror 64 kan naturligtvis variera enligt önskan. I fig. 2 visas endast två ljuskällor 58 och två därmed samverkande kameror 64.

 Mätytan utgör endast en del av resp. glasskivas 44, 46 totalyta för att mätningen ej skall domineras av randeffekter.

25 Genom att den övre glasplattan 46 kan höjas och sänkas inom ett område, som begränsas av motsvarande på cylinderväggen 36 anordnade stoppelement 66, 68 är det lätt att vidga mätspalten 48 för att vid behov rensola denna med vatten innan mätningen fortsätter. Mätspalten 48 behöver på detta sätt ej backspolas, vilket utgör det normala tillvägagångssättet vid konventionella konstruktioner.

30 Det har visat sig att det vid små mätspalter 48 (t. ex. 0,5 mm) sker en mycket effektiv uppslagning i själva mätspalten på grund av det skjuvflöde som uppstår där. Detta är positivt och viktigt för mätning av fiberhaltiga suspensionsflöden, där man vill hålla suspensionspartiklarna dispergerade under mätningen, och betonar ytterligare

vikten av att mäta vid smala och plana mätspalter. Genom systemet med återcirkulation förbättras förhållandena ytterligare.

5 Däremot finns en risk för att alltför stora partiklar eller konglomerat av partiklar stoppas upp före mätspalten 48. Genom val av förhållandena avseende fiberkoncentration (0,02 gram per liter som är mycket lågt) och flödes hastighet (större än 1 m/sek) kan dock åstadkommas att fibrerna vanligtvis passerar mätspalten 48 och att det endast undantagsvis blir ett stopp i suspensionsflödet. Med föreliggande uppfinning accepteras sålunda att enstaka mätningar kan störas om enstaka alltför stora partiklar medföljer provet. Detta kommer ej att slå ut mätsystemet, eftersom detta är
10 självrensande. Via dubbelprov och kontroll av avvikelser mellan dubbelproven kan man försäkra sig om att mätningarna är korrekta. Vid för stor avvikelse körs provet om.

I figur 3 visas mätspaltens 48 undre glasskiva 44. Suspensionsflödet kommer in genom inloppsöppningen 38 och strömmar radiellt utåt från den undre skivans 44 centrum mot periferin, såsom är markerat med pilar. Hela suspensionsflödet passerar denna väg. Vid inloppsöppningen 38 har suspensionsflödet fullt tryck och detta avtar
15 sedan radiellt utåt i mätspalten och suspensionen samlas därefter upp i den ringformiga uppsamlingsspalten 54 efter tryckfallet över mätspalten 48. Suspensionsflödet passerar slutligen genom utloppsöppningen 40 tillbaka till tanken 18 (fig. 1).

I figur 4 visas ett exempel på att den rörliga övre glasskivan 46 kan roteras med
20 hjälp av en motor 72. Suspensionsflödet kommer in via inloppsöppningen 38, passerar mätspalten 48 och strömmar slutligen ut via utloppsöppningen 40 (fig. 2). Därvid erhålls ökade skjuvkrafter i mätspalten. Detta möjliggörs tack vare konstruktionens rotationssymmetri. Genomströmningen i mätspalten 48 underlättas och möjligheten till att mekaniskt påverka fibrerna ökar via ökade skjuvkrafter i suspensionen när man
25 använder mätcellen för att utföra flexibilitetsmätning enligt patent SE 465 983.

Modifikationer av de ovan under hänvisning till ritningarna beskrivna arrangemangen är naturligtvis möjliga inom ramen för de efterföljande patentkraven.

PATENTKRAV

1. Anordning för mätning av fiberegenskaper i ett suspensionsflöde,
k ä n n e t e c k n a d av att den innefattar en mätcell (10), i vilken det finns en mellan
5 två begränsningsytor definierad mätspalt (48) samt organ (56) för reglering av
mätspaltens (48) bredd, att begränsningsytorna har motstående, transparenta partier (60,
62) för möjliggörande av genomstrålning av förbipasserande suspensionsflöde och
mätning på optisk väg, samt att mätcellen (10) dessutom har en för hela
suspensionsflödet avsedd inloppsöppning (38) och en för hela suspensionsflödet avsedd
10 utloppsöppning (40).
2. Anordning enligt kravet 1, k ä n n e t e c k n a d av att inloppsöppningen (38)
sträcker sig genom den ena begränsningsytan och att ett inloppsrör (42) för uppriktnig
och stabilisering av suspensionsflödet är anslutet till inloppsöppningen (38) och har en
15 längd, som är flera gånger större än dess bredd.
3. Anordning enligt kravet 1 eller 2, k ä n n e t e c k n a d av att mätspaltens (48)
begränsningsytor är plana och parallella.
- 20 4. Anordning enligt något av kraven 1-3, k ä n n e t e c k n a d av att mätspaltens (48)
begränsningsytor är cirkulära.
5. Anordning enligt något av kraven 1-4, k ä n n e t e c k n a d av att den andra
begränsningsytans periferi sträcker sig fram till en yttervägg (36) hos mätcellen (10) och
25 att ett mellanrum förekommer mellan nämnda ena begränsningsytas periferi och
ytterväggen (36) för bildande av en periferisk spalt (70).
6. Anordning enligt något av kraven 1-, k ä n n e t e c k n a d av att avståndet mellan
begränsningsytorna är reglerbart inom intervallet 0,5-5 mm.
30
7. Anordning enligt något av kraven 1-6, k ä n n e t e c k n a d av att nämnda andra
begränsningsyta är en del av en i mätcellen (10) rörlig cylinderkolv (46) och att nämnda
ena, med inloppsöppningen (38) försedda begränsningsyta är stationär.

8. Anordning enligt något av kraven 1-7, k ä n n e t e c k n a d av att nämnda yttervägg (36) hos mätcellen (10) är försedd med stoppelement (66, 68) för begränsning av cylinderkolvrörelsen i ett övre och ett undre läge.

5

9. Anordning enligt något av kraven 1-8, k ä n n e t e c k n a d av att inmatningsöppningen (38) är belägen centralt med avseende på nämnda ena begränsningsyta för erhållande av ett radiellt suspensionsflöde i mätspalten (48), med avtagande tryck i radiell riktning.

10

10. Anordning enligt något av kraven 1-9, k ä n n e t e c k n a d av att den rörliga begränsningsytan kan rotera med hjälp av en motor (72).

15

11. Anordning enligt något av kraven 2-10, k ä n n e t e c k n a d av att inloppsrörets (42) area tvärs flödesriktningen är större än mätspaltens (48) area tvärs flödesriktningen omedelbart efter inloppsöppningen (38).

SAMMANDRAG

En anordning för mätning av fiberegenskaper i ett suspensionsflöde.

Anordningen innefattar en mätcell (10), i vilken det finns en mellan två

5 begränsningsytor definierad mätpalt (48) samt organ (56) för reglering av mätpaltens bredd. Begränsningsytorna har motstående, transparenta partier (60, 62) för möjliggörande av genomstrålning av förbipasserande suspensionsflöde och mätning på optisk väg. Vidare har mätcellen (10) en för hela suspensionsflödet avsedd inloppsöppning (38) och en för hela suspensionsflödet avsedd utloppsöppning (40).

10

(Fig.2)

15

PCT

REQUEST

The undersigned requests that the present international application be processed according to the Patent Cooperation Treaty.

For receiving Office use only

International Application No.

International Filing Date

Name of receiving Office and "PCT International Application".

Applicant's or agent's file reference

(if desired) (12 characters maximum)

110014800/LB

Box No. I TITLE OF INVENTION

Measuring of fibre properties.

Box No. II APPLICANT

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no state of residence is indicated below.)

FIBERTRACKER AB
SE-184 84 ÅKERSBERGA
SWEDEN

☐ This person is also inventor.

Telephone No.

Facsimile No.

Teleprinter No.

State (that is, country) of nationality:

SWEDEN

State (that is, country) of residence:

SWEDEN

This person is applicant
for the purposes of:

☐

all designated States

☒

all designated States except the United States of America

☐

the United States of America only

☐

the States indicated in the Supplemental Box

Box No. III FURTHER APPLICANT(S) AND/OR (FURTHER) INVENTOR(S)

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no state of residence is indicated below.)

KARLSSON, Håkan Ingvar
Gransättravägen 76
SE-184 61 ÅKERSBERGA
SWEDEN

This person is:

☐

applicant only

☒

applicant and inventor

☐

inventor only (If this check-box is marked, do not fill in below.)

State (that is, country) of nationality:

SWEDEN

State (that is, country) of residence:

SWEDEN

This person is applicant
for the purposes of:

☐

all designated States

☐

all designated States except the United States of America

☒

the United States of America only

☐

the States indicated in the Supplemental Box

☒

Further applicants and/or (further) inventors are indicated on a continuation sheet.

Box No. IV AGENT OR COMMON REPRESENTATIVE; OR ADDRESS FOR CORRESPONDENCE

The person identified below is hereby/has been appointed to act on behalf of the applicant(s) before the competent International Authorities as:

☒

agent

☐

common representative

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)

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Teleprinter No.

☐

Address for correspondence: Mark this check-box where no agent or common representative is/has been appointed and the space above is used instead to indicate a special address to which correspondence should be sent.

Continuation of Box No. III FURTHER APPLICANTS AND/OR (FURTHER) INVENTORS

If none of the following sub-boxes is used, this sheet is not to be included in the request.

Name and address: <i>(Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (i.e. country) of residence if no state of residence is indicated below.)</i> <div style="text-align: center;">FRANSSON, Per-Ivar Ekbacksvägen 31 SE-184 32 ÅKERSBERGA SWEDEN</div>		This person is: <input type="checkbox"/> applicant only <input checked="" type="checkbox"/> applicant and inventor <input type="checkbox"/> inventor only <i>(If this check-box is marked, do not fill in below.)</i>
State (i.e. country) of nationality: SWEDEN	State (i.e. country) of residence: SWEDEN	
This person is applicant for the purposes of: <input type="checkbox"/> all designated States <input type="checkbox"/> all designated States except the United States of America <input checked="" type="checkbox"/> the United States of America only <input type="checkbox"/> the States indicated in the Supplemental Box		
Name and address: <i>(Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (i.e. country) of residence if no state of residence is indicated below.)</i>		This person is: <input type="checkbox"/> applicant only <input type="checkbox"/> applicant and inventor <input type="checkbox"/> inventor only <i>(If this check-box is marked, do not fill in below.)</i>
State (i.e. country) of nationality:	State (i.e. country) of residence:	
This person is applicant for the purposes of: <input type="checkbox"/> all designated States <input type="checkbox"/> all designated States except the United States of America <input type="checkbox"/> the United States of America only <input type="checkbox"/> the States indicated in the Supplemental Box		
Name and address: <i>(Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (i.e. country) of residence if no state of residence is indicated below.)</i>		This person is: <input type="checkbox"/> applicant only <input type="checkbox"/> applicant and inventor <input type="checkbox"/> inventor only <i>(If this check-box is marked, do not fill in below.)</i>
State (i.e. country) of nationality:	State (i.e. country) of residence:	
This person is applicant for the purposes of: <input type="checkbox"/> all designated States <input type="checkbox"/> all designated States except the United States of America <input type="checkbox"/> the United States of America only <input type="checkbox"/> the States indicated in the Supplemental Box		
Name and address: <i>(Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (i.e. country) of residence if no state of residence is indicated below.)</i>		This person is: <input type="checkbox"/> applicant only <input type="checkbox"/> applicant and inventor <input type="checkbox"/> inventor only <i>(If this check-box is marked, do not fill in below.)</i>
State (i.e. country) of nationality:	State (i.e. country) of residence:	
This person is applicant for the purposes of: <input type="checkbox"/> all designated States <input type="checkbox"/> all designated States except the United States of America <input type="checkbox"/> the United States of America only <input type="checkbox"/> the States indicated in the Supplemental Box		
Name and address: <i>(Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (i.e. country) of residence if no state of residence is indicated below.)</i>		This person is: <input type="checkbox"/> applicant only <input type="checkbox"/> applicant and inventor <input type="checkbox"/> inventor only <i>(If this check-box is marked, do not fill in below.)</i>
State (i.e. country) of nationality:	State (i.e. country) of residence:	
This person is applicant for the purposes of: <input type="checkbox"/> all designated States <input type="checkbox"/> all designated States except the United States of America <input type="checkbox"/> the United States of America only <input type="checkbox"/> the States indicated in the Supplemental Box		
<input type="checkbox"/> Further applicants and/or (further) inventors are indicated on another continuation sheet.		

Box No.V DESIGNATION OF STATES

The following designations are hereby made under Rule 4.9(a) (mark the applicable check-boxes; at least one must be marked):

Regional Patent

- ☐ **AP ARIPO Patent:** GH Ghana, GM Gambia, KE Kenya, LS Lesotho, MW Malawi, SD Sudan, SL Sierra Leone, SZ Swaziland, UG Uganda, ZW Zimbabwe, and any other State which is a Contracting State of the Harare Protocol and of the PCT
- ☐ **EA Eurasian Patent:** AM Armenia, AZ Azerbaijan, BY Belarus, KG Kyrgyzstan, KZ Kazakhstan, MD Republic of Moldova, RU Russian Federation, TJ Tajikistan, TM Turkmenistan, and any other State which is a Contracting State of the Eurasian Patent Convention and of the PCT
- ☒ **EP European Patent:** AT Austria, BE Belgium, CH and LI Switzerland and Liechtenstein, CY Cyprus, DE Germany, DK Denmark, ES Spain, FI Finland, FR France, GB United Kingdom, GR Greece, IE Ireland, IT Italy, LU Luxembourg, MC Monaco, NL Netherlands, PT Portugal, SE Sweden, and any other State which is a Contracting State of the European Patent Convention and of the PCT
- ☐ **OA OAPI Patent:** BF Burkina Faso, BJ Benin, CF Central African Republic, CG Congo, CI Côte d'Ivoire, CM Cameroon, GA Gabon, GN Guinea, GW Guinea-Bissau, ML Mali, MR Mauritania, NE Niger, SN Senegal, TD Chad, TG Togo, and any other State which is a member State of OAPI and a Contracting State of the PCT (if other kind of protection or treatment desired, specify on dotted line)

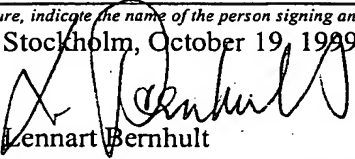
National Patent (if other kind of protection or treatment desired, specify on dotted line):

- | | |
|--|--|
| <input type="checkbox"/> AE United Arab Emirates..... | <input type="checkbox"/> LR Liberia..... |
| <input type="checkbox"/> AL Albania..... | <input type="checkbox"/> LS Lesotho..... |
| <input type="checkbox"/> AM Armenia..... | <input type="checkbox"/> LT Lithuania..... |
| <input type="checkbox"/> AT Austria..... | <input type="checkbox"/> LU Luxembourg..... |
| <input type="checkbox"/> AU Australia..... | <input type="checkbox"/> LV Latvia..... |
| <input type="checkbox"/> AZ Azerbaijan..... | <input type="checkbox"/> MA Morocco..... |
| <input type="checkbox"/> BA Bosnia and Herzegovina..... | <input type="checkbox"/> MD Republic of Moldova..... |
| <input type="checkbox"/> BB Barbados..... | <input type="checkbox"/> MG Madagascar..... |
| <input type="checkbox"/> BG Bulgaria..... | <input type="checkbox"/> MK The former Yugoslav Republic of Macedonia..... |
| <input type="checkbox"/> BR Brazil..... | <input type="checkbox"/> MN Mongolia..... |
| <input type="checkbox"/> BY Belarus..... | <input type="checkbox"/> MW Malawi..... |
| <input checked="" type="checkbox"/> CA Canada..... | <input type="checkbox"/> MX Mexico..... |
| <input type="checkbox"/> CH and LI Switzerland and Liechtenstein..... | <input type="checkbox"/> NO Norway..... |
| <input type="checkbox"/> CN China..... | <input type="checkbox"/> NZ New Zealand..... |
| <input type="checkbox"/> CR Costa Rica..... | <input type="checkbox"/> PL Poland..... |
| <input type="checkbox"/> CU Cuba..... | <input type="checkbox"/> PT Portugal..... |
| <input type="checkbox"/> CZ Czech Republic..... | <input type="checkbox"/> RO Romania..... |
| <input type="checkbox"/> DE Germany..... | <input type="checkbox"/> RU Russian Federation..... |
| <input type="checkbox"/> DK Denmark..... | <input type="checkbox"/> SD Sudan..... |
| <input type="checkbox"/> DM Dominica..... | <input type="checkbox"/> SE Sweden..... |
| <input type="checkbox"/> EE Estonia..... | <input type="checkbox"/> SG Singapore..... |
| <input type="checkbox"/> ES Spain..... | <input type="checkbox"/> SI Slovenia..... |
| <input type="checkbox"/> FI Finland..... | <input type="checkbox"/> SK Slovakia..... |
| <input type="checkbox"/> GB United Kingdom..... | <input type="checkbox"/> SL Sierra Leone..... |
| <input type="checkbox"/> GD Grenada..... | <input type="checkbox"/> TJ Tajikistan..... |
| <input type="checkbox"/> GE Georgia..... | <input type="checkbox"/> TM Turkmenistan..... |
| <input type="checkbox"/> GH Ghana..... | <input type="checkbox"/> TR Turkey..... |
| <input type="checkbox"/> GM Gambia..... | <input type="checkbox"/> TT Trinidad and Tobago..... |
| <input type="checkbox"/> HR Croatia..... | <input type="checkbox"/> TZ Tanzania..... |
| <input type="checkbox"/> HU Hungary..... | <input type="checkbox"/> UA Ukraine..... |
| <input type="checkbox"/> ID Indonesia..... | <input type="checkbox"/> UG Uganda..... |
| <input type="checkbox"/> IL Israel..... | <input checked="" type="checkbox"/> US United States of America..... |
| <input type="checkbox"/> IN India..... | <input type="checkbox"/> UZ Uzbekistan..... |
| <input type="checkbox"/> IS Iceland..... | <input type="checkbox"/> VN Viet Nam..... |
| <input type="checkbox"/> JP Japan..... | <input type="checkbox"/> YU Yugoslavia..... |
| <input type="checkbox"/> KE Kenya..... | <input type="checkbox"/> ZA South Africa..... |
| <input type="checkbox"/> KG Kyrgyzstan..... | <input type="checkbox"/> ZW Zimbabwe..... |
| <input type="checkbox"/> KP Democratic People's Republic of Korea..... | |
| <input type="checkbox"/> KR Republic of Korea..... | |
| <input type="checkbox"/> KZ Kazakhstan..... | |
| <input type="checkbox"/> LC Saint Lucia..... | |
| <input type="checkbox"/> LK Sri Lanka..... | |

Check-boxes reserved for designating States (for the purposes of a national patent) which have become party to the PCT after issuance of this sheet:

- ☐
- ☐

Precautionary Designation Statement: In addition to the designations made above, the applicant also makes under Rule 4.9(b) all other designations which would be permitted under the PCT except any designation(s) indicated in the Supplemental Box as being excluded from the scope of this statement. The applicant declares that those additional designations are subject to confirmation and that any designation which is not confirmed before the expiration of 15 months from the priority date is to be regarded as withdrawn by the applicant at the expiration of that time limit. (Confirmation of a designation consists of the filing of a notice specifying that designation and the payment of the designation and confirmation fees. Confirmation must reach the receiving Office within the 15-month time limit.)

Box No. VI PRIORITY CLAIM		<input type="checkbox"/> Further priority claim indicated in the Supplemental Box.		
Filing date of earlier application (day/month/year)	Number of earlier application	Where earlier application is:		
		national application: country	regional application: * regional Office	international application: receiving Office
item (1) 19/10/98 19 October 1998	9803557-9	SWEDEN		
item (2)				
item (3)				
<input checked="" type="checkbox"/> The receiving Office is requested to prepare and transmit to the International Bureau a certified copy of the earlier application(s) (only if the earlier application was filed with the Office which for the purposes of the present international application is the receiving Office) identified above as item(s): (1)				
* Where the earlier application is an ARIPO application, it is mandatory to indicate in the Supplemental Box at least one country party to the Paris Convention for the Protection of Industrial Property for which that earlier application was filed (Rule 4.10(b)(ii)). See Supplemental Box.				
Box No. VII INTERNATIONAL SEARCHING AUTHORITY				
Choice of International Searching Authority (ISA) (if two or more International Searching Authorities are competent to carry out the international search, indicate the Authority chosen; the two-letter code may be used):		Request to use results of earlier search; reference to that search (if an earlier search has been carried out by or requested from the International Searching Authority):		
ISA /SE		Date (day/month/year)	Number	Country (or regional Office)
Box No. VIII CHECK LIST; LANGUAGE OF FILING				
This international application contains the following number of sheets:		This international application is accompanied by the item(s) marked below:		
request :5		1. <input checked="" type="checkbox"/> fee calculation sheet		
description (excluding sequence listing part) :5		2. <input type="checkbox"/> separate signed power of attorney		
claims :2		3. <input type="checkbox"/> copy of general power of attorney; reference number, if any:		
abstract :1		4. <input type="checkbox"/> statement explaining lack of signature		
drawings :1		5. <input type="checkbox"/> priority document(s) identified in Box No VI as item(s):		
sequence listing part of description :		6. <input type="checkbox"/> translation of international application into (language):		
		7. <input type="checkbox"/> separate indications concerning deposited microorganism or other biological material		
		8. <input type="checkbox"/> nucleotide and/or amino acid sequence listing in computer readable form		
		9. <input checked="" type="checkbox"/> other (specify): List of representatives		
Total number of sheets: 14				
Figure of the drawings which should accompany the abstract: Figure 2		Language of filing of the international application: SWEDISH		
Box No. IX SIGNATURE OF APPLICANT OR AGENT				
Next to each signature, indicate the name of the person signing and the capacity in which the person signs (if such capacity is not obvious from reading the request).				
Stockholm, October 19, 1999  Lennart Bernhult Representative of the applicant				

For receiving Office use only	
1. Date of actual receipt of the purported international application:	2. Drawings:
3. Corrected date of actual receipt due to later but timely received papers or drawings completing the purported international application:	<input type="checkbox"/> received:
4. Date of timely receipt of the required corrections under PCT Article 11(2):	<input type="checkbox"/> not received:
5. International Searching Authority (if two or more are competent): ISA /	<input type="checkbox"/> 6. Transmittal of search copy delayed until search fee is paid

Date of receipt of the record copy by the International Bureau:	For International Bureau use only
---	-----------------------------------

Supplemental box	If the Supplemental Box is not used, this sheet should not be included in the request.
1.	<i>If, in any of the Boxes, the space is insufficient to furnish all the information: in such case, write "Continuation of Box No. ..." (indicate the number of the Box) and furnish the information in the same manner as required according to the captions of the Box in which the space was insufficient, in particular.</i>
(i)	<i>If more than two persons are involved as applicants and/or inventors and no "continuation sheet" is available: in such case, write "Continuation of Box No. III" and indicate for each additional person the same type of information as required in Box No. III. The country of the address indicated in this Box is the applicant's State (that is country) of residence if no State of residence is indicated below:</i>
(ii)	<i>If, in Box No. II or in any of the sub-boxes of Box No. III, the indication "the States indicated in the Supplemental Box" is checked: in such case, write "Continuation of Box No. II" or "Continuation of Box No. III" or "Continuation of Boxes No. II and No. III" (as the case may be), indicate the name of the applicant(s) involved and, next to (each) such name, the State(s) (and/or, where applicable, ARIPO, Eurasian, European or OAPI patent) for the purposes of which the named person is applicant:</i>
(iii)	<i>If, in Box No. II or in any of the sub-boxes of Box No. III, the inventor or the inventor/applicant is not inventor for the purposes of all designated States or for the purposes of the United States of America: in such case, write "Continuation of Box No. II" or "Continuation of Box No. III" or "Continuation of Boxes No. II and No. III" (as the case may be), indicated the name of the inventor(s) and, next to (each) such name, the State(s) (and/or, where applicable, ARIPO, Eurasian, European or OAPI patent) for the purposes of which the named person is inventor:</i>
(iv)	<i>If, in addition to the agent(s) indicated in Box No. IV, there are further agents: in such case, write "Continuation of Box No. IV" and indicate for each further agent the same type of information as required in Box No. IV;</i>
(v)	<i>If, in Box No. V, the name of any State (or OAPI) is accompanied by the indication "patent addition" or "certificate of addition" or if, in Box No. V, the name of the United States of America is accompanied by an indication "continuation" or "continuation-in-part": in such case, write "Continuation of Box No. V" and the name of each State involved (or OAPI), and after the name of each such State (or OAPI), the number of the parent title or parent application and the date of grant of the parent title or filing of the parent application:</i>
(vi)	<i>If, in Box No. VI, there are more than three earlier applications whose priority is claimed: in such case, write "Continuation of Box No. VI" and indicated for each additional earlier application the same type of information as required in Box No. VI:</i>
(vii)	<i>If, in Box No. VI, the earlier application is an ARIPO application: in such case, write "Continuation of Box No. VI", specify the number of the item corresponding to that earlier application and indicate at least one country party to the Paris Convention for the Protection of Industrial Property for which that earlier application was filed.</i>
2	<i>If, with regard to the precautionary designation statement contained in Box No. V, the applicant wishes to exclude any State(s) from the scope of that statement: in such case, write "Designation(s) excluded from precautionary designation statement" and indicate the name or two-letter code of each State so excluded.</i>
3	<i>If the applicant claims, in respect of any designated Office, the benefits of provisions of the national law concerning non-prejudicial disclosures of exceptions to lack of novelty: in such case, write "Statement concerning non-prejudicial disclosures or exceptions to lack of novelty" and furnish that statement below.</i>

CONTINUATION OF BOX IV:

Further representatives:

Agvald-Glas, Gunilla
 Bernhult, Lennart
 Bjerndell, Per
 Brundin, Gabriella
 Grahm, Cecilia
 Granström, Lars-Eric
 Grip, Joakim
 Hansson, Hans-Erik
 Hansson, Sven A.
 Hinz, Udo
 Karlsson, Per Tomas
 Lennfors, Stefan
 Lundström, Maria
 Nilsson, Brita
 Nordén, J. Åke
 Onn, Thorsten
 Petré, Urban
 Rilton, Kristina
 Westerlund, Örjan
 Åström, Elsa

PCT

FEE CALCULATION SHEET

Annex to the Request

For receiving Office use only

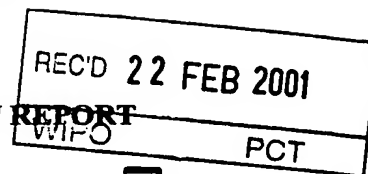
Applicant's or agent's file reference 110014800/LB	International application No. _____ Date stamp of the receiving Office _____
Applicant FIBERTRACKER AB, et al	
CALCULATION OF PRESCRIBED FEES	
1. TRANSMITTAL FEE	1000.- T
2. SEARCH FEE	8510.- S
International search to be carried out by <u>SE</u> <i>(If two or more International Searching Authorities are competent in relation to the international application, indicate the name of the Authority which is chosen to carry out the international search.)</i>	
3. INTERNATIONAL FEE	
Basic Fee The international application contains <u>14</u> sheets. first 30 sheets 3500.- b₁	
remaining sheets x <u>80</u> = b₂	
Add amounts entered at b ₁ and b ₂ and enter total at B 3500.- B	
Designation Fees The international application contains <u>THREE</u> designations <u>3</u> x <u>800</u> = 2400.- D	
number of designation fees payable (maximum 10)	amount of designation fee
Add amounts entered at B and D and enter total at I 5900.- I	
<i>(Applicants from certain States are entitled to a reduction of 75% of the international fee. Where the applicant is (or all applicants are) so entitled, the total to be entered at I is 25% of the sum of the amounts entered at B and D.)</i>	
4. FEE FOR PRIORITY DOCUMENT (if applicable)	--- P
5. TOTAL FEES PAYABLE	
Add amounts entered at T, S, I and P, and enter total in the TOTAL box 15410.-	
TOTAL	
<input type="checkbox"/> The designation fee is not paid at this time.	
MODE OF PAYMENT	
<input type="checkbox"/> authorization to charge deposit account (see below)	<input type="checkbox"/> bank draft
<input checked="" type="checkbox"/> cheque	<input type="checkbox"/> cash
<input type="checkbox"/> postal money order	<input type="checkbox"/> revenue stamps
<input type="checkbox"/> coupons <input type="checkbox"/> other (specify): _____	
DEPOSIT ACCOUNT AUTHORIZATION (this mode of payment may not be available at all receiving Offices)	
The RO/ SE _____	<input type="checkbox"/> is hereby authorized to charge the total fees indicated above to my deposit account.
	<input type="checkbox"/> is hereby authorized to charge any deficiency or credit any overpayment in the total fees indicated above to my deposit account.
	<input type="checkbox"/> is hereby authorized to charge the fee for preparation and transmittal of the priority document to the International Bureau of WIPO to my deposit account.
Deposit Account No. _____	Date (day/month/year) 19/10/99
Signature _____	

PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)



3

Applicant's or agent's file reference 110014800/LB	FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. PCT/SE99/01878	International filing date (<i>day/month/year</i>) 19.10.1999	Priority date (<i>day/month/year</i>) 19.10.1998
International Patent Classification (IPC) or national classification and IPC ₇ G 01 N 21/05, G 01 N 21/88		
Applicant FIBERTRACKER AB et al		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 4 sheets, including this cover sheet.

☒ This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of 4 sheets.

3. This report contains indications relating to the following items:

- I ☒ Basis of the report
- II ☐ Priority
- III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV ☐ Lack of unity of invention
- V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☐ Certain defects in the international application
- VIII ☐ Certain observations on the international application

Date of submission of the demand 18.05.2000	Date of completion of this report 29.01.2001
Name and mailing address of the IPEA/SE Patent- och registreringsverket Box 5055 S-102 42 STOCKHOLM Facsimile No. 08-667 72 88	Authorized officer Johan Westerbergh/ELY Telephone No. 08-782 25 00

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.

PCT/SE99/01878

I. Basis of the report

1. With regard to the **elements** of the international application:*

- ☐ the international application as originally filed
- ☒ the description:
 pages 3-6, as originally filed
 pages _____, filed with the demand
 pages 1-2a, filed with the letter of 21.12.2000
- ☒ the claims:
 pages _____, as originally filed
 pages _____, as amended (together with any statement) under article 19
 pages _____, filed with the demand
 pages 7, filed with the letter of 21.12.2000
- ☒ the drawings:
 pages 1, as originally filed
 pages _____, filed with the demand
 pages _____, filed with the letter of _____
- ☐ the sequence listing part of the description:
 pages _____, as originally filed
 pages _____, filed with the demand
 pages _____, filed with the letter of _____

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language English which is:

- ☐ the language of a translation furnished for the purposes of international search (under Rule 23.1(b)).
- ☒ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of the translation furnished for the purposes of international preliminary examination (under Rules 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. ☐ The amendments have resulted in the cancellation of:

- ☐ the description, pages _____
- ☐ the claims, Nos. _____
- ☐ the drawings, sheet/fig _____

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2 (c)).**

* Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are annexed to this report since they do not contain amendments (Rules 70.16 and 70.17).

** Any replacement sheet containing such amendments must be referred to under item I and annexed to this report.

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.

PCT/SE99/01878

**V. Reas ned statement under Article 35(2) with regard t novelty, inventive step r industrial applicability;
citati ns and explanati ns supporting such statement****1. Statement**

Novelty (N)	Claims	<u>1-7</u>	YES
	Claims		NO
Inventive step (IS)	Claims	<u>1-7</u>	YES
	Claims		NO
Industrial applicability (IA)	Claims	<u>1-7</u>	YES
	Claims		NO

2. Citations and explanations (Rule 70.7)

The invention according to the amended claims filed with the letter of 21 December 2000 relates to a device for optical measurements of fibre properties in a flowing suspension. A measuring field is defined between two limiting, transparent surfaces. The surfaces are adjustable to be able to vary the width of the measuring field. The measuring cell has inlet and outlet intended for the whole of the suspension flow. The invention is characterised in that the inlet opening extends through one of the limiting surfaces.

Most relevant documents cited in the International Search Report:

D1: SU 1573401

D1 describe a measuring cell for optical measurements. A measuring field is defined between two limiting, transparent surfaces. The surfaces are adjustable to be able to vary the width of the measuring field. The measuring cell has inlet and outlet intended for the whole of the suspension flow. (See abstract and fig.1)

The invention according to claim 1 differs from the device described in D1 in that the inlet opening extends through on of the limiting surfaces. Hence, the invention according to claim 1 is novel. Furthermore, this feature is considered to involve an inventive step since it is not obvious for a person skilled in the art to modify the device described in D1 so as to arrive at the claimed invention. The advantage with the invention over prior art is that this positioning of the inlet flow make it possible to introduce flow properties of the suspension not possible by the use of the device described in D1.

.../...

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.

PCT/SE99/01878

Supplemental B x

(To be used when the space in any of the preceding boxes is not sufficient)

Continuation of: V.

Hence, the invention according to claim 1 and thereupon dependent claims 2-7 is novel, regarded to involve an inventive step and to have industrial applicability.

Measuring fibre properties

The present invention relates to a device that allows the measurement of fibre properties in a flowing suspension, which device includes a measuring cell in which there is a measuring field defined between two limiting surfaces and a means of adjusting the width of the measuring field, the limiting surfaces having two opposing, transparent sections that allow illumination through the flowing suspension passing through and measurement by optical means, and the measuring cell having an inlet opening intended for the whole of the suspension flow and an outlet opening intended for the whole of the suspension flow.

The basic principle for a measurement of the intended type is that the fibres are introduced into a measuring chamber. In the measuring chamber, the fibres are illuminated and observed by an optical system. The optical system has a limited depth of focus. This requires that the extension of the measuring chamber must be less than the depth of focus. This is to make it possible to obtain sharp images of the fibre and means that the dimensions are normally very small, which in turn leads to major problems in eliminating blockage of the measuring chamber.

One example of this basic principle is the so-called Kajaani meter (FS200), that today allows a standard method for analysing the length of fibres in the laboratory. In this known meter, fibres flow through a capillary with a diameter of 0.2-0.4 mm. The advantage of a capillary is that the fibre is oriented in two planes. Measurement of it is facilitated when the fibre is oriented in the direction of flow. The problem here is that the capillary blocks easily if larger particles also follow in the flow. Such a meter is therefore not suitable for use on-line in the processing industry when impurities can occur and at the same time as one has extreme demands on the availability of the measuring instrument.

In the measurement systems Optikappa and PQM, which relate to an on-line arrangement for measuring the quality of fibres, the fibres have to flow through a glass cuvette of sufficiently large dimensions so that the risk of it becoming blocked is very small. The dimensions across the area of flow are 10x10 mm. This has been used in a factory environment for some considerable time and works satisfactorily on-line with good availability. However, the problem with this solution is that it does

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not allow sufficiently good optical focus in the imaging.

US 5,311,290 describes a measuring device for measuring in a column-shaped section. Here, a flow of fibres surrounded by a flow of pure water is processed in the measurement section. This is claimed to reduce the risk of blockage due to bundles of
5 fibres, fibre flocculation and/or so-called straggles. One therefore avoids the use of very narrow measuring columns.

Swedish application No. 870 44 85-5 describes a device for preparing a suspension for measuring in a column-shaped measuring section with high concentrations of fibre. The principle is built on there being a narrower column immediately in
10 front of the measuring column where energy is supplied in the form of a rotating impeller that is arranged to disrupt flocculation and larger impurities. As the impurities are broken down, the risk of blockage is consequently reduced.

US 3,740,156 shows how a sample is captured between two windows that are moveable across the direction of flow.

15 EP 0 302 009 shows two moveable windows in a channel.

Both latter named arrangements do not, however, work satisfactorily in a flow containing fibres when one wants to measure the particle size distribution of the fibres in a manner that is fully statistically correct. There is a large risk of fractionation caused by the gradient of the flow as only part of the passage is closed.

20 The present invention takes into consideration many of the disadvantages of the designs named above and is characterised firstly in that the inlet opening extends through one of the limiting surfaces.

Advantageous embodiments of the new measurement device are evident from the non-independent claims 2-7.

25 The new design allows optical measurement of fibre properties with both high precision and good focus, whereby the problem of blockage of the measuring field is at the same time eliminated in a simple and practical manner. In addition, with one preferred embodiment, it is possible to obtain a measurement flow that is better than described in US 5,311,290. In the present case, the direction across the flow in the
30 x/y plane can be considered as indefinite. The flow can also be considered as flow in a thin indefinite plane between two permanent limiting surfaces. Well-defined mea-

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asuring conditions thus exist with little influence of disturbing edge effects.

There is little risk of blockage according to the invention as the fibres flow through a measuring field whose width can be altered. During measurement, the measuring field is given a width so that a good image of the particles being studied is

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CLAIMS

1. Device for measuring fibre properties in a flowing suspension, which device includes a measuring cell (10) in which there is a measuring field (48) defined between two limiting surfaces and a means (56) of adjusting the width of the measuring field (48), the limiting surfaces having two opposing, transparent sections (60, 62) that allow illumination through the flowing suspension passing through and measurement by optical means, and the measuring cell (10) having an inlet opening (38) intended for the whole of the suspension flow and an outlet opening (40) intended for the whole of the suspension flow, characterised in that the inlet opening (38) extends through one of the limiting surfaces.

2. Device according to claim 1, characterised in that an inlet tube (42) for directing and stabilising the suspension flow is connected to the inlet opening (38) and has a length that is greater than its width.

3. Device according to any of claims 1 and 2, characterised in that the periphery of the other limiting surface extends to reach an outer wall (36) of the measuring cell (10) and that an intermediate space occurs between the periphery of the said one limiting surface and the outer wall (36) to form a peripheral field (54).

4. Device according to any of claims 1-3, characterised in that the distance between the limiting surfaces is adjustable within the range of 0.5-5 mm.

5. Device according to any of claims 1-4, characterised in that the inlet opening (38) is positioned centrally with regard to the said one limiting surface to obtain a radial suspension flow in the measuring field (48) having circular limiting surfaces, with a pressure that diminishes in a radial direction.

6. Device according to any of claims 1-9, characterised in that the other limiting surface is rotatable by the aid of a motor (72).

7. Device according to any of claims 2-6, characterised in that the area of the inlet tube (42) across the direction of flow is greater than the area of the measuring field (48) across the direction of flow immediately after the inlet opening (38).

Measuring fibre properties

The present invention relates to a device that allows the measurement of fibre properties in a flowing suspension.

The basic principle for a measurement of the intended type is that the fibres
5 are introduced into a measuring chamber. In the measuring chamber, the fibres are illuminated and observed by an optical system. The optical system has a limited depth of focus. This requires that the extension of the measuring chamber must be less than the depth of focus. This is to make it possible to obtain sharp images of the fibre and means that the dimensions are normally very small, which in turn leads to major problems in
10 eliminating blockage of the measuring chamber.

One example of this basic principle is the so-called Kajaani meter (FS200), that today allows a standard method for analysing the length of fibres in the laboratory. In this known meter, fibres flow through a capillary with a diameter of 0.2-0.4 mm. The advantage of a capillary is that the fibre is oriented in two planes. Measurement of it is
15 facilitated when the fibre is oriented in the direction of flow. The problem here is that the capillary blocks easily if larger particles also follow in the flow. Such a meter is therefore not suitable for use on-line in the processing industry when impurities can occur and at the same time as one has extreme demands on the availability of the measuring instrument.

In the measurement systems Optikappa and PQM, which relate to an on-line
20 arrangement for measuring the quality of fibres, the fibres have to flow through a glass cuvette of sufficiently large dimensions so that the risk of it becoming blocked is very small. The dimensions across the area of flow are 10x10 mm. This has been used in a factory environment for some considerable time and works satisfactorily on-line with good availability. However, the problem with this solution is that it does not allow sufficiently
25 good optical focus in the imaging.

US 5,311,290 describes a measuring device for measuring in a column-shaped section. Here, a flow of fibres surrounded by a flow of pure water is processed in the measurement section. This is claimed to reduce the risk of blockage due to bundles of fibres, fibre flocculation and/or so-called straggles. One therefore avoids the use of very
30 narrow measuring columns.

Swedish application no. 870 44 85-5 describes a device for preparing a suspension for measuring in a column-shaped measuring section with high concentrations

of fibre. The principle is built on there being a narrower column immediately in front of the measuring column where energy is supplied in the form of a rotating impeller that is arranged to disrupt flocculation and larger impurities. As the impurities are broken down, the risk of blockage is consequently reduced.

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Both latter named arrangements do not, however, work satisfactorily in a flow containing fibres when one wants to measure the particle size distribution of the
10 fibres in a manner that is fully statistically correct. There is a large risk of fractionation caused by the gradient of the flow as only part of the passage is closed.

The present invention takes into consideration many of the disadvantages of the designs named above and is characterised firstly in that it includes a measuring cell in which there is a defined measuring field between two limiting surfaces as well as a device
15 for adjusting the width of the measuring field, that the limiting surfaces have opposing transparent sections that allow illumination to penetrate the flow of the suspension as it passes by and measurement by optical means, and that the measuring cell also has an inlet opening intended for the whole of the flow of the suspension and an outlet opening intended for the whole of the flow of the suspension.

20 Advantageous embodiments of the new measurement device are evident from the non-independent claims 2-11.

The new design allows optical measurement of fibre properties with both high precision and good focus, whereby the problem of blockage of the measuring field is at the same time eliminated in a simple and practical manner. In addition, with one
25 preferred embodiment, it is possible to obtain a measurement flow that is better than described in US 5,311,290. In the present case, the direction across the flow in the x/y plane can be considered as indefinite. The flow can also be considered as flow in a thin indefinite plane between two permanent limiting surfaces. Well-defined measuring conditions thus exist with little influence of disturbing edge effects.

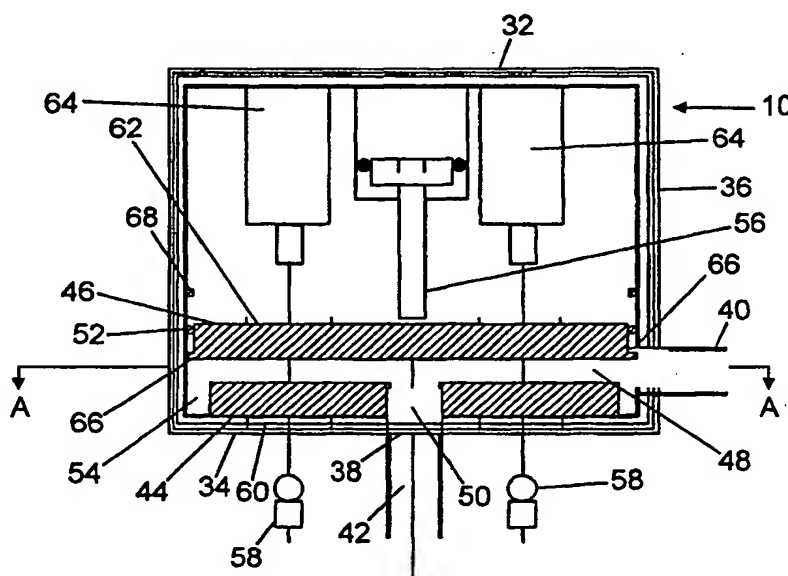
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<p>(21) International Application Number: PCT/SE99/01878</p> <p>(22) International Filing Date: 19 October 1999 (19.10.99)</p> <p>(30) Priority Data: 9803557-9 19 October 1998 (19.10.98) SE</p> <p>(71) Applicant (for all designated States except US): FIBER-TRACKER AB [SE/SE]; S-184 84 Åkersberga (SE).</p> <p>(72) Inventors; and (75) Inventors/Applicants (for US only): KARLSSON, Håkan, Ingvar [SE/SE]; Gransåtravägen 76, S-184 61 Åkersberga (SE). FRANSSON, Per-Ivar [SE/SE]; Ekbacksvägen 31, S-184 32 Åkersberga (SE).</p> <p>(74) Agents: BERNHULT, Lennart et al.; AB Stockholms Patentbyrå, Zacco & Bruhn, P.O. Box 23101, S-104 35 Stockholm (SE).</p>		<p>(81) Designated States: CA, US, European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE).</p> <p>Published With a revised version of the international search report. In English translation (filed in Swedish)</p> <p>(88) Date of publication of the revised version of the international search report: 29 June 2000 (29.06.00)</p>	

(54) Title: MEASURING OF FIBER PROPERTIES



(57) Abstract

Device for measuring fibre properties in a flowing suspension. The device includes a measuring cell (10) in which there is a measuring field (48) defined between two limiting surfaces and a means (56) of adjusting the width of the measuring field. The limiting surfaces have two opposing, transparent sections (60, 62) that allow illumination through the flowing suspension passing through and measurement by optical means. In addition, the measuring cell (10) has an inlet opening (38) intended for the whole of the suspension flow and an outlet opening (40) intended for the whole of the suspension flow.

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